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December 6, 2000

Ref: 8EPR-PS

To: Jim Christiansen, 8EPR-SR
Richardson Flat Tailings Remedial Project Manager

From: Mary Goldade, Chemist

Subject: Comments on the Draft Sampling and Analysis Plan for Richardson Flat

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At your request, a review of the of the *Draft Sampling and Analysis Plan for Richardson Flat* (October 24, 2000) was performed. This Sampling and Analysis Plan (SAP) was submitted by the United Park City Mines Company (UPCM) for EPA review.

The SAP was reviewed for minimum components prescribed in the *EPA QA/G-5 Guidance on Quality Assurance Project Plans – Interim Final* (November 1999) and the *EPA QA/G-4 Guidance for the Data Quality Objectives Process* (September 1994). Four major areas were evaluated during the review. These are summarized below.

1. Data Quality Objectives (DQOs)
2. Field Screening and Sampling
3. Laboratory Analysis
4. Quality Assurance/Quality Control (QA/QC) Procedures

Review comments are attached. Comments pertaining to the overall design of the document are summarized under the General Comments section. Comments regarding the detail of the SAP and its appendices are provided in the Specific Comments section. Wherever possible, an attempt was made to provide suggestions and examples to aid the UPCM in preparing the revised document. For your convenience, several examples of text that is often used to address some of the QA/QC issues are provided in Appendix A. However, these should be used for example only and should be modified appropriately as applicable to the project-specific requirements. Please note that it was not always possible to provide pertinent examples; therefore, if additional clarification is necessary, feel free to contact me as the revision process progresses.

Attachments (3)

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*General Comments*

It appears that UPCM has put forth effort in developing and organizing the SAP using the EPA QA/R-5 guidance. However, there are several key components of the plan that should be improved or augmented to fully support the sampling and analysis activities. These are outlined below.

1. Data Quality Objectives. Table 1 is reserved to provide the project DQOs, data uses, data type categories and quality control (QC) levels. Several components of the DQO process are not addressed. The DQO process is a seven-step, iterative approach designed to ensure that all components of study design (e.g., problem statement, decision statement, decision inputs, study boundaries, decision rule and limits on decision errors) are completely thought out and well-defined. If carefully addressed, DQOs outline the following about each problem statement posed: a) rationale for addressing the problem statement; b) steps necessary to obtain data appropriate for addressing the problem statement; c) methods to be used in data interpretation; d) decision errors that affect interpretation of the information gathered; and e) processes for optimizing the plan. EPA's guidance document for DQO development is given in QA/G-4 (September 1994).

   Section 3.1.4, Sediment, page 19 is one example of how applying the complete the DQO process to the SAP will resolve several questions that a reader unfamiliar with the project may have. This section states that six sediment samples will be collected in the south diversion ditch to aid in the determination of elevated zinc levels detected in water samples and recommends a list of metals for analysis (Table 5). This target analyte list includes several more parameters than just zinc. Appropriate rationale has be provided for zinc, a similar discussion should be presented for the remaining list of target analytes. While LRLs are presented in Table 2, this section would also be improved with a discussion of minimum concentration levels required in sediment matrix and a rationale for this requirement. In addition, adequate scientific justification to support the number and depth of samples should also be presented.

2. Background samples. The SAP states that one background soil sample was collected in 1984. Unless additional and adequate historical data are available, this is a significant data gap that should be addressed. A plan to assess natural contaminant levels present for all target analytes and all media sampled in the surrounding area and to compare background levels with site contamination must be included in the SAP.

3. Database Management. This SAP does not provide for or describe the intended database management procedures including data transfer, database population, database maintenance, and database storage. An integral component of data generation is data management, therefore a section for this must be added. [Jim: The VBI70 Phase III QAPP (August 1999) is particularly detailed in these areas. If OK with Bonnie, I could copy

several pages of this for UPCM ]

4. Standard Operating Procedures (SOPs). The SOPs provided as an attachment to the SAP were reviewed. Several important components appeared to be consistently omitted. Standard Operating Procedures (SOPs) should be written with the understanding that the information contained within them will be used in the field by samplers who may not be familiar with the overall project goals and may have limited experience with the or performance of the activity or procedure. SOPs must be written to serve as a step-by-step guide and must include all steps necessary to complete a procedure from start to finish (including equipment decontamination and field documentation). The EPA has a guidance document available to assist in the development of SOPs: Guidance for the Development of Standard Operating Procedures for Quality-Related Documents EPA QA/G-6 (November 1995). This and other useful quality assurance documents and guidelines are available online at: http://www.epa.gov/r10earth/offices/oea/qaindex.htm.

5. Data Review and Assessment. The SAP is weak in the areas of data review and assessment. Specific examples are provided in the Specific Comments. EPA has several examples of QAPPs that have adequately addressed these sections and suggest that these be used to provide examples of pertinent language. [Jim: The Ogden Railyard QAPP (January 2000) is particularly detailed in these areas. If OK with Mario, I could copy several pages of this for UPCM ]

6. Missing QAPP Components. The SAP did not appear to include all components recommended in the EPA QA/R-5. Some of the components that did not appear to be addressed include: Special Training/Certification (A8), Documents and Records (A9), Instrument/Equipment Testing, Inspection and Maintenance (B6), and Data Management (B10). Note that these sections do not necessarily have to be extensive, but should be sufficient in detail to address the problem and to provide evidence that a process is in place prior to project implementation. In some cases, only a sentence or two may be necessary.

***Specific Comments***

*Sampling and Analysis Plan*

1. Distribution List (A3). Include a list of individuals and their organizations who will receive copies of the approved QAPP and any subsequent revisions.

2. Section 2.2.1.2, Ground Water, page 8. This section states that "If the data do not meet QA/QC goals the data will be used to guide decisions based on a qualitative basis." Data not meeting project QA/QC requirements should not used for decision-making at the site. It is suggested that this statement be revised to make the use of qualitative data more

clear. For example: "If the data do not meet QA/QC goals, the data will not be used in decision-making directly. Rather, these data will be used to optimize the data gathering process and additional data points that meet QA/QC requirements will be collected and used for decision-making."

3. Section 2.4, Data Quality Objectives for Measurement Data, page 14, bullets. The bullets in this section define the difference between screening data and definitive data. A couple of important components that distinguish definitive from screening data are not adequately captured. First, in order to be used in the decision-making process, screening data must be confirmed via a method that generates definitive data. As currently written, the SAP does not identify data generation techniques that fall into the screening data category; therefore, definitive confirmation is not required. Secondly, definitive data may be generated at the site or at an off-site location (EPA Superfund Data Categories [September 1993]). Therefore, pH data and water level measurements may be considered definitive for their intended uses, providing sufficient evidence exists to demonstrate that procedures were followed and data were generated and documented in accord with project requirements. It is recommended that both bullets, defining screening and definitive data, be removed from the SAP. The SAP should require sufficient QA/QC to ensure that all data collected for this project and used in decision-making are definitive in nature.

4. Section 2.4, Data Quality Objectives for Measurement Data, page 14. This section states that "All data collected during the RI/FS, except for decontamination water samples collected for pH testing in the field, will be considered "definitive"..." This statement is an important one, but should be revised to read as follows: "All data generated during the RI/FS is intended to be collected for use in site characterization and risk assessment; therefore, definitive data (data of known quality) are required for all aspects of this project."

5. Section 3.0, Measurement/Data Acquisition, page 15, second paragraph, third sentence. Replace the phrase "will b tied" with "will be tied".

6. Section 4.1, Assessments and Response Actions (C1). This section is quite brief and does not adequately include all the components required in the EPA guidance. According to EPA QA/R-5, this section should provide detail on assessments to be employed during the project. Assessments can and often should occur during the sampling and data acquisition phases of the project. They provide a proactive means for assessing the processes and procedures employed during data generation allowing for sufficient time to make corrections, if necessary. Assessments can be in the form of field and/or laboratory technical systems audits, data quality audits or validation, and performance evaluations, among others. In addition to describing the type(s) of assessments that will be used, this section should also provide: the planned frequency for each proposed assessment; the

personnel and/or agency responsible for the assessment activity; and the corrective action procedures for each assessment. Using EPA QA/R-5 as a guide, describe what type and frequency of assessments are planned. An example of language used in other project plans is provided in Attachment A.

7. Section 5.1, Data Review, Validation and Verification Requirements (D1). This section indicates that the requirements and methods for data validation and verification are listed in Tables 3 and 4. EPA agrees that use of the tables is a convenient way to supply data verification components; however, these tables should be refined to include additional information.. Comments pertaining to these tables are provided below.

*Table 3*

A) The table appears to address PARCC components as they pertain primarily to field QC samples. To be complete, PARCC components for laboratory QC samples should also be included (e.g., instrument blanks, laboratory method duplicates, post-digestion spikes). If a table is prepared similar to the one provided in Attachment A, all pertinent QC criteria and corrective action will be addressed in a single table. Provide the laboratory control limits for both the matrix spikes and laboratory control samples in the next revision. The "Summary of QA/QC Goals" can then be removed from this table.

B) Precision. Under Evaluation Criteria: replace "reproducibility" with RPD for the matrix spike/matrix spike duplicate pair.

C) Accuracy. Under QC Program: Please clarify what Lab-Specified Historical limits are and how they are used.

D) Comparability. Under QC Program: Remove Field Duplicate Pairs.

E) Completeness. Under Evaluation Criteria: Provide a definition for "valid".

*Table 4*

The information contain in this table is a summary of activities that should occur when assessing the data. As stated previously, it does not provide sufficient detail to perform a validation or verification and then assign data qualifiers as a result of that review.

8. Section 5.2, Validation and Verification Methods (D2). This section states that data validation and verification will be conducted on a minimum of 90% of samples. However, this statement is vague in three important areas: a) definitions of validation and verification; b) rationale for application of the 90% rate for validation and verification; and c) steps used for data qualification during validation and verification.

A) For your convenience, Superfund's working definitions for data validation and verification are provided below:

> Data Verification: A consistent, systematic process that determines whether the data have been collected in accordance to the specification as listed in the contract requirements included within the approved Quality Assurance Project Plan (QAPP). This process is independent of data validation and is conducted at various levels both internal and external to the data generator (laboratory).
>
> Data Validation: An evaluation of the technical usability of the verified data with respect to planned objectives. Data validation is performed external to the data generator (laboratory), using a defined set of performance criteria to a body of data in the evaluation process. This may include checks on some or all of the calculations in the data set and reconstruction of some or all final reported data from initial laboratory data (e.g. chromatograms, instrument printouts). It is in the data validation process that data qualifiers for each verified data are evaluated. It extends beyond the analytical method or contractual compliance to protocols or QAPPs to address the overall technical usability of the generated data.

B) This section should indicate whether the rate of 90% applies to both verification and validation or if different fractions of data will be verified and validated. It is common for 100% of the data to be verified both internally at the analytical laboratory and externally by independent reviewers. Independent reviews may be UPCM or a subcontractor experienced in this type of review. Chemical data validation is quite labor intensive and must be performed by a chemist experienced in the data validation and qualification process. Because of this, generally 10% of the data are validated. If problems are uncovered as a result of the validation effort, an outline for handling the further reviews must also be included in this section.

C) This section states "The degree of sample deviation beyond acceptance limits will be evaluated for its potential effect on data usability." EPA agrees that an assessment of data usability must be performed for data generated for this project. The QAPP must define an objective approach for how data are assessed. The data validation effort typically uses *National Functional Guidelines for Data Review* (Inorganic & Organic: February, 1994) to assign application of data quality indicators, if specific qualification requirements are not identified in the QAPP.

9. References. A list of all documents cited or used in preparation of the SAP must be included as the last section in the SAP, rather than as an appendix. Likewise, a list of all documents cited or used in preparation of the Health and Safety Plan (HASP) must also be included as

the last section in the HASP.

10. Figure 1 - Richardson Flat RI/FS Organizational Chart. As presented, the organizational chart is misleading at the level of State and Federal agency oversight. The EPA Project Coordinator and the UDERR Project Manager work cooperatively to oversee the work being performed at the Richardson Flat site. The chart should be modified such that it does not appear that Mr. Christiansen oversees work performed by Mr. Thiriot; but rather, they both oversee work performed by UPCM and its subcontractors. In addition, the organizational chart identifies the ASARCO/AEC laboratory for sample analysis. However, based upon the chart, we are unsure how Frontier Geosciences, Inc. fits into the organizational scheme. Because a Laboratory Quality Assurance Plan (LQAP) was provided in Attachment 12 of the ASARCO/AEC Quality Assurance Manual, we assume that Frontier Geosciences will perform a portion of the analytical work. Please clarify the relationship with Frontier Geosciences as it relates to ASARCO/AEC and the project as a whole.

11. Table 2. Laboratory Reporting Limits are summarized in Table 1. However, the rationale supporting these values as they relate to project requirements is not provided. Identifying the minimum concentration that each target analyte must be detected is a key component of the DQO process. This step ensures that LRLs are sufficient to support end use purposes (e.g., risk assessment). Project-required detection limits are typically established a combination of methods which may include (depending on site-specific exposure scenarios-conceptual site model): 1) using screening-level values from the Region III Risk-Based Concentration Table or calculated site-specific values; 2) Safe Drinking Water Act Maximum Contaminant Level criteria; 3) Ambient Water Quality Criteria; or 4) other State or Federal regulations. The LQAP provides a list of total metals method detection limits for ICP Methods 6010B/200.7 and 6020/200.8 updated in 1998. A comparison between project requirements and laboratory capabilities must be performed to determine if the selected laboratories are able to meet project requirements or if LRL requirements may be relaxed.

12. Table 2. Provide rationale explaining why both ICP and ICP/MS methods are recommended for metals analysis of each sample. Both ICP and ICP/MS methods are capable of performing a metals scan that provides the results for all metals on the parameter list with the exception of mercury. Therefore, analytical effort may be conserved if only one method is selected. Development of project-required detection limits will also help to determine whether one or both of these methods are necessary.

13. Table 2. This is a nice summary of project requirements, but please revise the table to improve accuracy as follows:
    A) Change "polyurethane" to "polyethylene".
    B) Soil holding time of 180 days for chromium must be added.
    C) Cite Preservative for all metals in water as "2 ml $HNO_3$ (pH<2)"
    D) Clarify the units in the LRL column. For example, identify which rows have units of

ppm, which are ppm based upon dry weight, and the units for conductivity.

E) To ensure that solid samples may be reported on a dry weight basis, add percent moisture to the parameter list.

F) Provide the reference for hardness method (e.g. Standard Methods, 20th ed.)

G) Change the holding time for hardness to 180 days, since it is a calculation that uses calcium and magnesium results measured by ICP.

H) Reference pH method as EPA 150.1.

I) Change the analytical method for sulfate from SW-846 9036 to EPA 375.2 and change preservative and/or bottle selection accordingly.

J) It is not necessary to collect an additional bottle (Bottle 3) for calcium, potassium, magnesium, and sodium. These parameters are captured during the 6010 or 6020 metals scan.

K) Change the holding time for carbonate and bicarbonate to 14 days as these parameters are analyzed with alkalinity.

L) Change the holding time for sulfate to 28 days.

14. Include a section that describes the sample identification (Sample ID) procedures for both investigative and quality control (QC) samples collected at the site. A unique numbering system that does not identify QC samples is recommended. That is, "self-reading" Sample IDs that indicate "-Dup" or "-D" are discouraged as the QC sample may not be blind to the laboratory. An example SOP is attached (Attachment A)

*Standard Operating Procedures*

Refer to General Comment #4. Not all SOPs were reviewed; however, an example of components that should be addressed is provided below for one SOP:

RMC SOP 1

1. Sampling Equipment. This section provides a list of equipment needed for surface water sampling. Each item should include a description and/or definition of the item; in cases where the item is optional ("if necessary"), then an explanation of when the item is required should also be included.

2. Dissolved Metals and Total Metals Analysis. Both sections state that the samples will be "preserved with 2 ml of $NO_3$". Please replace "$NO_3$" with "nitric acid ($HNO_3$)". Additionally, these sections state: "...sufficient to bring the sample to pH < 2". Include the following sentence: "The pH level in the samples will be verified using pH paper before bottles are sealed."

3. Dissolved Metals Analysis. This section states that "samples will be field filtered". A description of the steps and equipment necessary to perform field filtering must be included

in this section.

4. Cations/Anions and Total Suspended Solids. Details outlining the steps for collection and preservation of these samples has been omitted and should be included in the next version of the SOP.

5. Documentation. A section describing the information that must be recorded in the field notebook and log forms must be incorporated into the next version of the SOP. In addition, this section should reference the sample handling and documentation SOP (RMC SOP 5).

*Laboratory Licenses & Laboratory Quality Assurance Plan*

1. The environmental laboratory license presented in the QAPP Appendices that was issued to ASARCO/AEC by the Arizona Department of Health Services expired on January 20, 2000. Please provide a copy of the updated license in the next version of the QAPP.

2. How are data generated at the ASARCO/AEC lab going to be submitted to the PRP? (Electronically and/or hardcopy?) This information is not contained in the Laboratory Quality Assurance Plan (LQAP). Rather than update the LQAP, UPCM may address this concern in the Data Management section of the SAP.

3. Section VIII Data Reduction, Validation and Reporting, page 9. LQAP contains sections that appear to have been developed solely for a single type of analysis (ICP 6010B) as it provides specific accuracy requirements for this method (e.g., ICV/CCV between 90-110% recovery). While this defect should be corrected in the next edition of the LQAP, EPA considers this a minor problem as other areas of the LQAP (Table: Quality Control Requirements) exhibit an understanding that each analytical method has QC criteria. However, because the LQAP contains inaccurate precision and accuracy requirements and data review and validation procedures, the SAP should specifically state the precision and accuracy requirements and the data review and validation procedures for the methods selected for the project. Additionally, the SAP should include a statement indicating that if contradictions between the various documents are identified, the information contained in the SAP supercedes all other documents.

4. Holding Times. This LQAP should include a list of specific holding times for the target analytes performed at the laboratory.

5. Attachment 4, Central Logbook Record. The contents of this attachment are missing.

6. Attachment 7, Method Detection Limits. This section provides a summary of total metals method detection limits (MDLs) for ICP Methods 6010B/200.7 and 6020/200.8. The units are identified as "ppb". While it is inferred that the MDLs are for water matrix (based upon

the cited mercury method reference and levels of detection), this table should be revised to indicate for which sample matrix these detection limits apply. Soil method detection limits are typically 100 times higher than water MDLs; these limits should also be provided in the LQAP. Additionally, analysis of the MDLs occurred in 1998. EPA recommends that MDLs be updated or confirmed a minimum of annually.

7. Attachment 12. The LQAP for Frontier Geosciences appears quite complete, but the certifications are not included as suggested by the list of contents provided on the "Appendices" cover page.